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PETER I. LIPPMAN
ASHEN AND LIPPMAN
4385 OCEAN VIEW BOULEVARD
MONTROSE, CALIFORNIA 91020

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EXAMINER	
TUNG, B	
ART UNIT	**PAPER NUMBER**
2615	8

DATE MAILED: 11/15/94

This is a communication from the examiner in charge of your application.
COMMISSIONER OF PATENTS AND TRADEMARKS

☒ This application has been examined ☒ Responsive to communication filed on 8-22-94 ☐ This action is made final.

A shortened statutory period for response to this action is set to expire 3 month(s), — days from the date of this letter.
Failure to respond within the period for response will cause the application to become abandoned. 35 U.S.C. 133

Part I THE FOLLOWING ATTACHMENT(S) ARE PART OF THIS ACTION:

1. ☐ Notice of References Cited by Examiner, PTO-892.
2. ☐ Notice of Draftsman's Patent Drawing Review, PTO-948.
3. ☐ Notice of Art Cited by Applicant, PTO-1449.
4. ☐ Notice of Informal Patent Application, PTO-152.
5. ☐ Information on How to Effect Drawing Changes, PTO-1474.
6. ☐ _____.

Part II SUMMARY OF ACTION

1. ☒ Claims 1, 10, 19, 28, and 33-72 are pending in the application.

   Of the above, claims _____ are withdrawn from consideration.

2. ☒ Claims 2-9, 11-18, 20-27, and 29-32 have been cancelled.

3. ☒ Claims 1, 10, 19, and 28 are allowed.

4. ☒ Claims 33-72 are rejected.

5. ☐ Claims _____ are objected to.

6. ☐ Claims _____ are subject to restriction or election requirement.

7. ☒ This application has been filed with informal drawings under 37 C.F.R. 1.85 which are acceptable for examination purposes.

8. ☐ Formal drawings are required in response to this Office action.

9. ☐ The corrected or substitute drawings have been received on _____. Under 37 C.F.R. 1.84 these drawings are ☐ acceptable; ☐ not acceptable (see explanation or Notice of Draftsman's Patent Drawing Review, PTO-948).

10. ☐ The proposed additional or substitute sheet(s) of drawings, filed on _____. has (have) been ☐ approved by the examiner; ☐ disapproved by the examiner (see explanation).

11. ☐ The proposed drawing correction, filed _____, has been ☐ approved; ☐ disapproved (see explanation).

12. ☐ Acknowledgement is made of the claim for priority under 35 U.S.C. 119. The certified copy has ☐ been received ☐ not been received ☐ been filed in parent application, serial no. _____; filed on _____.

13. ☐ Since this application apppears to be in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under Ex parte Quayle, 1935 C.D. 11; 453 O.G. 213.

14. ☐ Other

EXAMINER'S ACTION

Status of Claims

1. Claims 1, 10, 19, 28, and 33-72 are pending in the application. Claims 2-9, 11-18, 20-27, and 29-32 have been cancelled per Applicant's request.

Disclosure Informalities

2. On page 30 of the response filed 8-22-94, Applicant requests amendments to page 19 of the specification at lines 13 and 15. However, these amendments are unclear to the Examiner. It is apparent that Applicant may have intended to change lines "3" and "5" instead of respective lines "13" and "15". In any event, the Examiner does not understand how amended equation (1) is different from original equation (1). Furthermore, the Examiner does not understand the meaning of "funny quotes". Appropriate explanation is required.

35 U.S.C. §112, 2nd Paragraph

3. Claims 64-66 are rejected under 35 U.S.C. § 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Correction of the following is required to overcome the rejection under 35 U.S.C. §112, second paragraph:

(1) Claim 40, line 2, the meaning of "geometrical effects" is unclear. (See also claim 43, line 2).

(2) Claim 64, line 11, the meaning of "no image slicer" is unclear.

(3) Claim 64, line 12-13, the meaning of "no other image-remapping device" is unclear. Specifically, the claim does not define "image remapping device". (I.e., other than what?)

35 U.S.C. §103

4. The following is a quotation of 35 U.S.C. § 103 which forms the basis for all obviousness rejections set forth in this Office action:

> A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.
>
> Subject matter developed by another person, which qualifies as prior art only under subsection (f) or (g) of section 102 of this title, shall not preclude patentability under this section where the subject matter and the claimed invention were, at the time the invention was made, owned by the same person or subject to an obligation of assignment to the same person.

5. Claims 33-72 are rejected under 35 U.S.C. § 103 as being unpatentable over Kato et al in view of Takaoka et al.

The use of lidar for imaging objects in a backscattering medium is well known in the art as shown by the prior art disclosed and not relied upon. Kato et al, as shown generally in Figures 5 and 6(A)-6(C), discloses a three dimensional object imaging system comprising pulsed laser illumination means (56) and a streak tube (3) having inherent cathode, anode, and phosphor portions, wherein the streak tube (3) forms successive thin strip-shaped electronic image segments (col.4, ln.54-57) and distributes the successive segments by way of deflecting electrodes (311) to form two dimensional composite images as shown in Figs. 6(A)-6(C). Kato et al also discloses the use of an image recording device (5) and a monitor (e.g., 14 in Fig.4). The two dimensional composite images in Figs. 6(A)-(C) are slices of the volume surrounding a cone shaped object (1A). The cone shaped object (1A) is analogous to, for example, a submarine in the ocean, and the volume surrounding the cone shaped object (1A) is analogous to the water surrounding the submarine. The present invention achieves three dimensional imaging by scanning a volume of the ocean in a direction from the rear of an aircraft to the front of the aircraft. Similarly, the imaging system of Kato et al achieves three dimensional imaging by scanning the volume surrounding the cone shaped object (1A) in a direction from the narrow tip of the cone to the wide base of the cone (col.4, ln.60-62). While Kato et al uses shift electrodes (306) to

achieve the scanning from the top of the cone to the bottom of the cone, the present invention uses the motion of the aircraft to achieve scanning. Takaoka et al, as shown in Figure 1, teaches the idea of using aircraft motion to scan in a direction of aircraft travel. Furthermore, Takaoka et al teaches the possibility of using a thin fan-shaped pulse of laser light (col.2, ln.19-20). While Takaoka et al discusses drawbacks of using pulsed laser light, these drawbacks would be solved by using a streak tube like the one shown by Kato et al. Having the three dimensional laser imaging system of Kato et al and then given the teachings of Takaoka et al, it would have been obvious to one of ordinary skill in the art to adapt a streak tube like that of Kato et al for mounting on an aircraft like that of Takaoka et al to use the aircraft's motion for scanning. Doing so would expand the two dimensional system of Takaoka et al into a three dimensional system for imaging volume areas including but not limited to an ocean volume. Other applications could include airborne reconnaissance over land.

6. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Bryan S. Tung whose telephone number is (703) 308-6614.

7. Any inquiry of a general nature or relating to the status of this application should be directed to the Group receptionist whose telephone number is (703) 305-4700.

Bryan S. Tung/bst
11-3-94

TOMMY P. CHIN
SUPERVISORY PATENT EXAMINER
GROUP 2600
5/29/95
Resigned